

WHAT IS CLAIMED IS:

1. A compound press-forming apparatus including an upper die fixed to an
5 elevated-side portion of a press machine that is moved up and down by an elevator, a lower
die fixed to a fixed-side portion of the press machine, and working portions formed at
respective corresponding portions of the upper and lower dies to conduct press working to a
work jointly, comprising:

a side-face working apparatus that is disposed at the side of said lower die on the
10 fixed-side portion of the press machine to conduct side-face press working to a side-face
portion of the work jointly with the lower die,

wherein said side-face working apparatus comprises a rotating base that is
supported on the fixed-side portion of the press machine so as to rotate thereon, a
reciprocating base that is supported on said rotating base so as to reciprocate thereon, a
15 side-face working portion that is formed at an end portion of said reciprocating base to
conduct side-face press working to the side-face portion of the work jointly with said lower
die, and reciprocating driving means for moving said reciprocating base from an original
position, in which said side-face working portion is away from the work, to a side-face press
working position, in which the side-face press working is conducted to the work by said
20 side-face working portion, and

said side-face working apparatus is constituted such that it moves to an avoidance
position, in which the side-face working apparatus is not in the way of the upper die going
up and down, during said press working by the upper and lower dies, whereas it moves to a
working capable position, in which said side-face press working is capable, after the upper
25 die goes up, during said side-face press working by the side-face working portion and the
lower die.

2. The compound press-forming apparatus of claim 1, wherein said side-face

working apparatus is constituted so as to move between said avoidance position and said working capable position according to the rotation of said rotating base of the side-face working apparatus.

3. The compound press-forming apparatus of claim 2, wherein said rotating base is supported on the fixed-side portion of the press machine through a bearing portion so as to rotate thereon, and comprises a driving apparatus that rotates said rotating base and a stopper that is disposed on the fixed-side portion of the press machine and supports said rotating base together with said bearing portion by making a top end thereof contact the rotating base, and said avoidance position of the side-face working apparatus is provided by rotating said rotating base to its substantially inverted position, whereas said working capable position of the side-face working apparatus is provided by rotating said rotating base to its laid position in which the rotating base is put on said stopper.

4. The compound press-forming apparatus of claim 2, wherein said reciprocating driving means comprises a driving cam portion that includes a slant face disposed at the lower face of said upper die, a sliding cam-follower portion that is disposed at the upper face of said reciprocating base and constituted so as to slide by being pushed by said slant face of said driving cam portion when said upper die goes down according to the press machine's operation, and returning means that urges said reciprocating base to return from said side-face press working position to said original position on said rotating base and is constituted of a spring.

5. The compound press-forming apparatus of claim 2, wherein said work to be conducted by the press working is a door inner panel for vehicles, steps of drawing and excising are conducted to a flat portion of said door inner panel by said press working of the upper and lower dies, whereas a step of excising is conducted to a side-face portion of the door inner panel by said side-face press working of the side-face working apparatus and the lower die.

6. The compound press-forming apparatus of claim 5, wherein said side-face

working apparatus is constituted so as to be disposed at least at three positions around said lower die to conduct press working to at least three side-face portions of said door inner panel, which are located at the sides of vehicle front, rear and lower, respectively.

7. A compound press-forming apparatus including an upper die fixed to an elevated-side portion of a press machine that is moved up and down by an elevator, a lower die fixed to a fixed-side portion of the press machine, and working portions formed at respective corresponding portions of the upper and lower dies to conduct press working to a work jointly, comprising:

a side-face working apparatus that is disposed at the side of said lower die on the fixed-side portion of the press machine to conduct side-face press working to a side-face portion of the work jointly with the lower die,

wherein said side-face working apparatus comprises a rotating base that is supported on the fixed-side portion of the press machine so as to rotate thereon, a side-face working portion that is formed to conduct side-face press working to the side-face portion of the work jointly with said lower die, and oil-pressure driving means for moving said side-face working portion from an original position, in which said side-face working portion is away from the work, to a side-face press working position, in which the side-face press working is conducted to the work by said side-face working portion, and

said side-face working apparatus is constituted such that it moves to an avoidance position, in which the side-face working apparatus is not in the way of the upper die going up and down, during said press working by the upper and lower dies, whereas it moves to a working capable position, in which said side-face press working is capable, after the upper die goes up, during said side-face press working by the side-face working portion and the lower die.

8. The compound press-forming apparatus of claim 7, wherein said side-face working apparatus is constituted so as to move between said avoidance position and said working capable position according to the rotation of said rotating base of the side-face

working apparatus.

9. The compound press-forming apparatus of claim 8, wherein said rotating base is supported on the fixed-side portion of the press machine through a bearing portion so as to rotate thereon, and comprises a driving apparatus that rotates said rotating base and a stopper that is disposed on the fixed-side portion of the press machine and supports said rotating base together with said bearing portion by making a top end thereof contact the rotating base, and said avoidance position of the side-face working apparatus is provided by rotating said rotating base to its substantially inverted position, whereas said working capable position of the side-face working apparatus is provided by rotating said rotating base to its laid position in which the rotating base is put on said stopper.

10. The compound press-forming apparatus of claim 8, wherein said oil-pressure driving means comprises a piston driving portion that is driven by oil pressure, a piston that is provided with said side-face working portion at an end thereof, and an oil-pressure controller that controls oil pressure supplied to said piston driving portion.

11. The compound press-forming apparatus of claim 8, wherein said side-face working apparatus further comprises a reciprocating base that is supported on said rotating base so as to reciprocate thereon and provided with said side-face working portion at an end thereof, and said oil-pressure driving means comprises a piston driving portion that is driven by oil pressure, a piston rod whose one end is coupled to the piston driving portion and the other end is coupled to said reciprocating base, and an oil-pressure controller that controls oil pressure supplied to said piston driving portion.

12. The compound press-forming apparatus of claim 8, wherein said work to be conducted by the press working is a door inner panel for vehicles, steps of drawing and excising are conducted to a flat portion of said door inner panel by said press working of the upper and lower dies, whereas a step of excising is conducted to a side-face portion of the door inner panel by said side-face press working of the side-face working apparatus and the lower die.

13. The compound press-forming apparatus of claim 12, wherein said side-face working apparatus is constituted so as to be disposed at least at three positions around said lower die to conduct press working to at least three side-face portions of said door inner panel, which are located at the sides of vehicle front, rear and lower, respectively.

5 14. A compound press-forming method, in which a work is formed by an upper die fixed to an elevated-side portion of a press machine that is moved up and down by an elevator, a lower die fixed to a fixed-side portion of the press machine, and a side-face working apparatus disposed at the side of the lower die on the fixed-side portion of the press machine, comprising:

10 an upper/lower-face press working step of conducting press working to the work by moving down said upper die in cooperation with said lower die; and

 a side-face press working step of conducting side-face press working to a side-face portion of the work, which is subsequent to said upper/lower face press working step, by moving said side-face working apparatus after said upper die is moved up in cooperation
15 with said lower die,

 wherein said side-face press working step comprises a positioning step in which said side-face working apparatus is moved from a moved-back position, in which the side-face working apparatus does not interfere with said upper die during said upper/lower-face press working step, to a position in a space formed above the lower die
20 after the upper die is moved up so as to position the side-face working apparatus at the side of the lower die, and a working step in which said side-face press working is conducted to the side-face portion of the work that is put on the lower die after said upper/lower-face press working step is conducted.

 15. The compound press-forming method of claim 14, wherein said work to be
25 conducted by the press working is a door inner panel for vehicles, said upper/lower-face press working step includes steps of drawing and excising that are conducted to a flat portion of said door inner panel, whereas said side-face press working step includes a step

of excising that is conducted to a side-face portion of the door inner panel.